adphos

User Manual

NIR120 M(X)

Version 1.0 (USA_UL)
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adphos
Innovation in thermal processing

Thank you for purchasing an adphos NIR drying system.

This manual will help to show the proper installation, operation and maintenance of your NIR drying system and how it can be safely and efficiently operated on your with your inkjet printing system.

NIR drying systems were developed with regard to the highest safety standards. Proper installation, operation and maintenance of the system never places trained operators or maintenance personnel at risk.

For your own safety and the safety of others, please read the following procedures in this manual and follow all safety instructions.

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Declaration of Conformity

1. Indented use

The adphos NIR120 M(x) drying systems were developed for complete and secure drying of **water-based and soft solvent non-flammable inks** for continuous and drop-on-demand inkjet systems.

It was designed for **build in use** in commercial printing devices.

Warning

Fire hazard

The drying of hard solvent based flammable inks and the use in hazard areas are not permitted with this adphos NIR drying system configuration.

For solvent applications special available NIR system configurations are required. Call our central service point .
(phone +49-8061-395-0 or +1 262-790-9100).

The standard mounting position of the NIR120 M(x) drying system is horizontal (see chapter 3.3), at which, as a result of the special design, the modules can be mounted in any orientation parallel to the paper surface.

Depending on operating conditions, the power of the drying module is adjustable by varying the control voltage (either by an external signal, e.g. tachometer, or by an internal potentiometer upper side of the drying module).

2. General safety instructions

2.1. Sentinels

Different sentinels are used in this user manual to point out potential risks during operation or maintenance of NIR drying modules. Table 1 shows the used sentinels and their meanings. These sentinels are also placed on appropriate parts of the drying system. Please adhere to the safety instructions and procedures described in this manual.

Table 1: Sentinels and their meanings

Sentinel	Meaning
	Attention! Exclamation point: This sentinel is used for safety notes.
	Attention: hot surface, do not touch! Every attempt has been made to keep all surfaces as cool as possible. However some surfaces such as emitters and reflectors can reach very high temperatures where serious burns can occur by touching these areas. Please adhere to the corresponding safety instructions carefully.
	Attention: electrical voltage! Only electrical trained personal is allowed to work at current carrying parts. Before start to work, the complete drying system has to be strictly cut off from power and power cables have to get disconnected.
	Attention: NIR radiation! This sign indicates a possible hazard by NIR radiation during the drying process. Generally NIR radiation does not damage human tissue. However at close distances to the radiation source, burns to the skin can occur. Very close and direct view of the radiation source without eye protection can cause damages to the eyes.

2.2. Safety

adphos NIR drying systems are designed to be safe and effective when operated according to the guidelines outlined in this user manual. As with other industrial systems, there is a risk of personal injury if the products are not used according to the guidelines outlined in this manual.

Warning: There is a risk of personal injury by improper use of this equipment.

The following sections include information regarding operational safety for different aspects of the dryer system.

Important: To ensure safe operation of this unit, personnel must be trained regarding the proper use of this equipment.
Installation and operation of the system according to the instructions as outlined in this user manual by properly trained personal will avoid unforeseeable safety risks.

2.3. NIR radiation

NIR emitters send out an electromagnetic spectrum with a wavelength around 1µm. Because of the high yield of visible light during operation, do not look directly into the radiation source without eye protection. Looking directly at the radiation source may cause eye damage.
If direct exposure of the light to the eyes occurs please seek medical attention. For further protection one may consider wearing class 4 protective goggles (Adphos-order-no.: 008857).

To minimize the light from the surrounding area, a light shield may be mounted at the dryer modules (optional equipment).

2.4. NIR Emitter

The NIR radiation is generated by a special NIR emitter, which includes a tungsten filament which is heated up to 3000K by an electrical voltage. To increase the life of the emitters, a small amount of halogen gas is added.

All materials used to manufacture the emitters are environmentally benign. Burned out or broken emitters can be disposed of in traditional domestic waste. No special disposition is required. The chemical compounds (tungstenhalides, deposition of tungsten at the quartz glass), which may build up during improper use, are harmless in these concentrations.

Injuries can occur through the breakage of the quartz glass tube. The wearing of gloves and eye protection are recommended when handling the emitters. Glass particles, halides and pieces of filament can get removed by a broom and dustpan or a vacuum cleaner. Wear gloves to avoid injuries.

Wear only cotton gloves when handling NIR emitters. Sebaceous residues on the glass surface will reduce operation time dramatically.

2.5. High Temperature

In spite of the cooling of the high temperature NIR emitters, the temperature of the reflector system and parts of the housing, will exceed 49° C (120° F). Therefore touching the NIR drying module and housing can only occur when the items have had sufficient time to cool.

2.6. Electrical voltage

NIR emitters operate at a voltage of 240 VAC.
Do not replace NIR emitters or attempt to repair drying systems with electrical power to the units.
Before replacing NIR emitters, opening the power cabinet or removing any protection plates, make certain there is no electrical current going to the power cabinet.

3. System description

3.1. General

The adphos NIR drying systems type NIR120 M(x) are high power systems with integrated power supply and control devices.

The drying module has a drying width of 4.72” (120mm) and a drying length of 9.84” (250mm). The physical dimensions of the module are 5.63” (143mm) width x 14.57” (370mm) length x 9.49” (241mm) high (including handholds).

The module includes a high efficiency reflector area with 3 NIR emitters.

The module is cooled by internal fan blower. An electronically controlled thermostat is also installed on the reflector to avoid overheating.

The power supply is built-in in the NIR drying module. The required control elements are also integrated at the upper side of the module. An integrated emitter failure detection sensor watches the emitter operation and indicates disorders by a optical signal (LED).

An USB interface allows the parameterization and customizing of the NIR120 M2/3/4 drying systems.

An additional security feature is the integrated inclination sensor. The sensor avoid an accidentally switch-on of the drying system in a non-operating-position e.g. during the maintenance.

3.2. System features

4 Versions of the NIR120 M(x) drying system are available. They differ in the installed maximum NIR Emitter power and in the capability to control the drying system via USB interface (see table 1).

Table 1: available NIR120 M versions

Type	Emitter power (max.)	Total power (max.)	USB interface	adphos-no.
NIR120 M1	3 x 1.1 kW	3 kW	no	735 891
NIR120 M2	3 x 1.1 kW	3 kW	yes	735 892
NIR120 M3	3 x 2.1 kW	5,8 kW	yes	735 893
NIR120 M4	3 x 3.1 kW	8,3 kW	yes	735 894

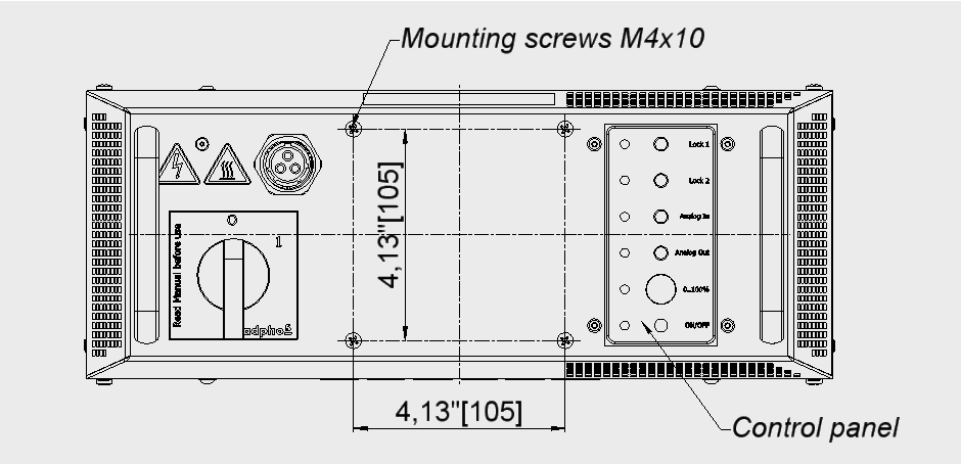
3.3. Mounting

To affix the modules on a customizing mount system, 4 fastening points with a M4 screw thread are placed on the upper side of the NIR module (see figure 1). The distance between the fastening points are 4.13” (105mm) squared.

Remark:

For the fixation use only screws with a thread length of maximum 0.3" (8 mm) to avoid contact with built-in components.

Figure 1: Fastening points on the upper side of the NIR120 M module



The standard operating position is horizontal. The integrated inclination sensor allows a deviation of ≤ 10° (default) from the horizontal along all movement axis.

Remark for NIR120 M2, NIR120 M3, NIR120 M4:

For non-horizontal applications the standard operation position of these drying system versions can be customized by configuration the inclination sensor by the USB connector.
Call our central service point (phone +49-8061-395-0 or +1 262-790-9100) for detailed information.

To ensure proper operation of the dryer, the distance between paper and bottom edge of the module must be min. 0.2" (5 mm).

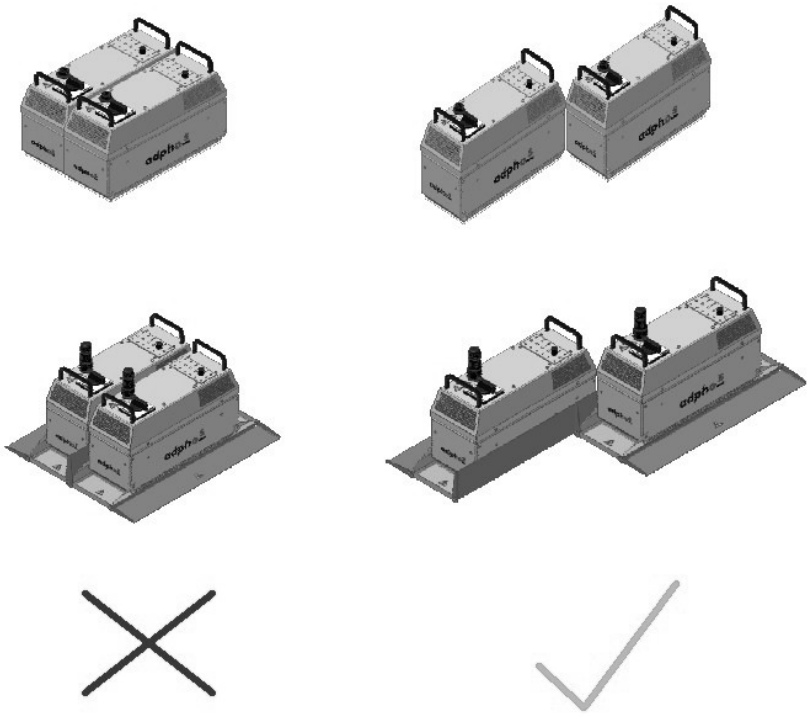
Caution

Burn hazard

By the NIR radiation the surface opposite of the modules could be exceed more than 49°C (120°F).
Don't touch the surfaces during operation!
Be sure that no thermal sensitive devices are in the heating area.

For the drying of large scale papers, NIR120 M modules can be mounted side by side. Because of cooling problems don't place the NIR drying modules directly side by side but mount them displaced as shown in figure 2 for a proper cooling.

Figure 2: 2 drying modules mount side by side



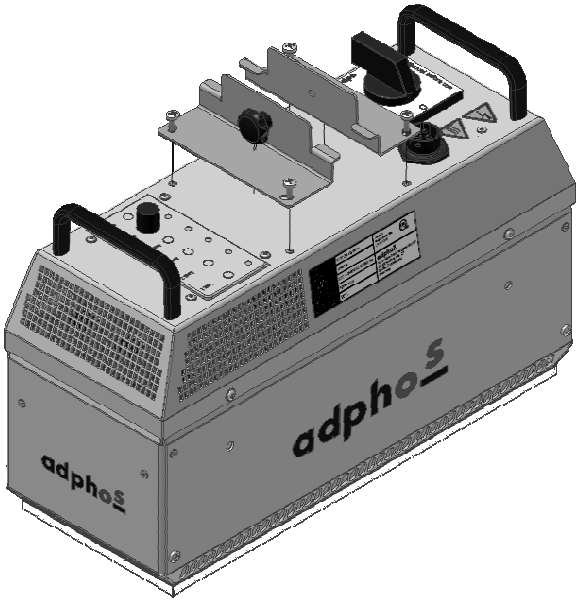
3.3.1. Fastening kit (optional, adphos no.: 735 640)

To mount a NIR120 M drying system on an Item-profile size 8, a special fastening kit is available. The kit consists of two angle brackets with a slut nut and a star grip each. Ausgleichswinkel 3°? (Berge)

The fastening kit can affix the module at the 4 fastening points described in chapter 3.3 (see figure 3).

To order the optional fastening kit, call our central service point
(phone +49-8061-395-0 or +1 262-790-9100) for detailed information.

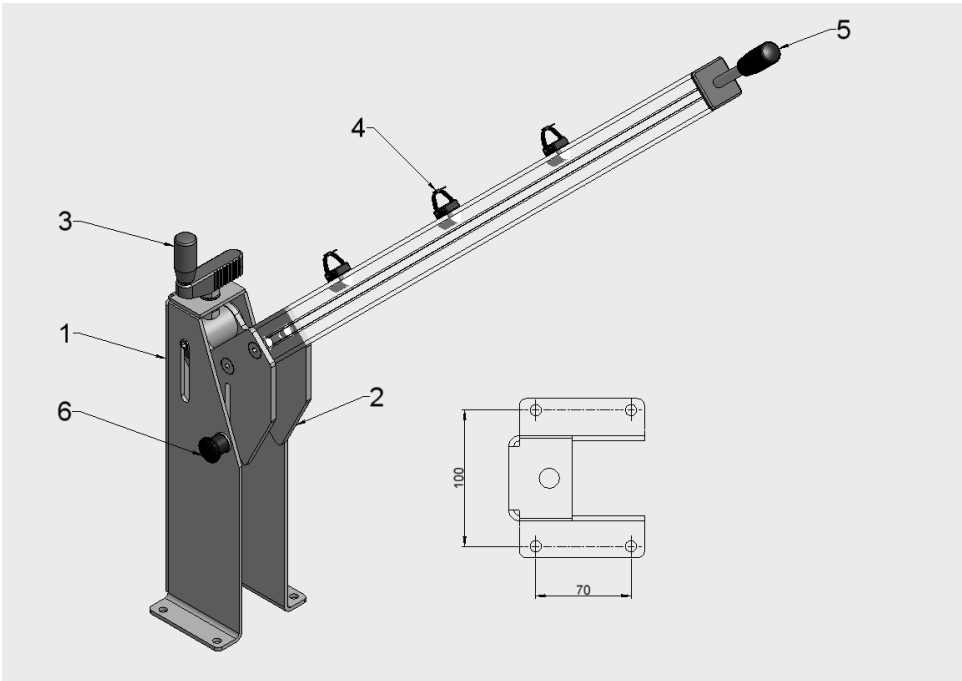
Figure 3: mounting the fastening kit at the NIR120 M module



3.3.2. Mount (optional, adphos no.: 735 294)

The optional available mount (see figure 4) is designed for a safe and quick positioning of the NIR120 M-systems at the production line with a Item-profile size 8. The mount has a total high of 16.5” (419 mm) and a square base of 4.6” (117mm). To fix the mount on the machine base four bores with 0.33” (8,5mm) in diameter are integrated in the square base. The hole pattern is also shown in figure 4.

Figure 4: mount



The mount consists of a tie bar (1) with a movable attachment (2) for an Item-profile size 8. The Item-profile will fixed by four T-slut nuts at the attachment.

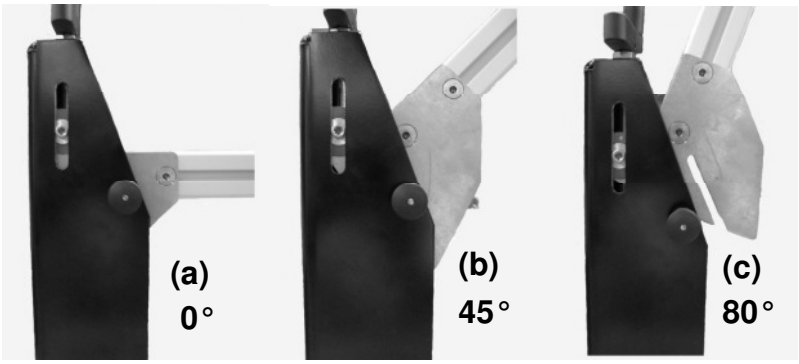
In combination with the optional fastening kit the NIR120 M module can mount in a short time at the Item-profile. Cables will be fixed with cable ties at the 3 fixing points (4) on the upper side of the item profile 3

To adjust the correct distance to the paper the attachment can variegate over a range of 2.4” (60 mm) in height by the crank handle (3) on the top of the tie bar.

To make the maintenance comfortable or get a easy access to the paper the position of the module to the substrate can change and fixed in 3 positions (see fig. 5). Therefore the latching bolt (6) on the side of the tie bar must pull and the Item profile with the fixed module can fold up in the designated position by the hand hold (5) at the end of the profile.

To order the mount kit, call our central service point
(phone +49-8061-395-0 or +1 262-790-9100) for detailed information.

Figure 5: working (a) and two maintenance positions (b, c) of the drying module



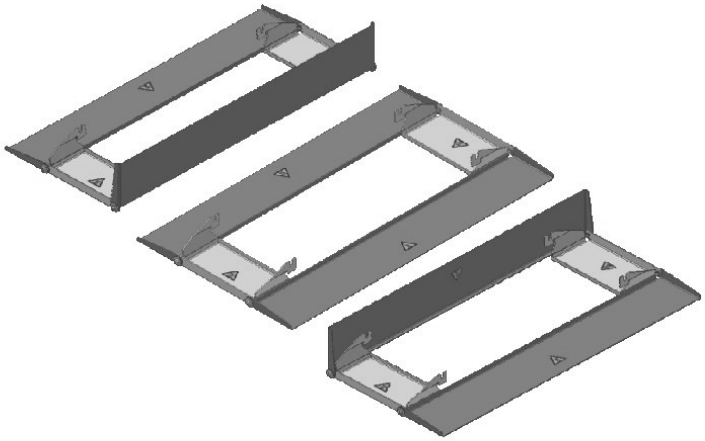
3.3.3. Light shield (optional, adphos no.: 735 294)

The optional available light shield is shown in fig. 6 and can mount at the base of the NIR120 M drying modules to avoid a possible dazzle of the operator by the intensive light emission of the NIR-Emitter.

The physical dimensions of the light shield are 11.5” (292mm) width x 20” (507,5mm) length.

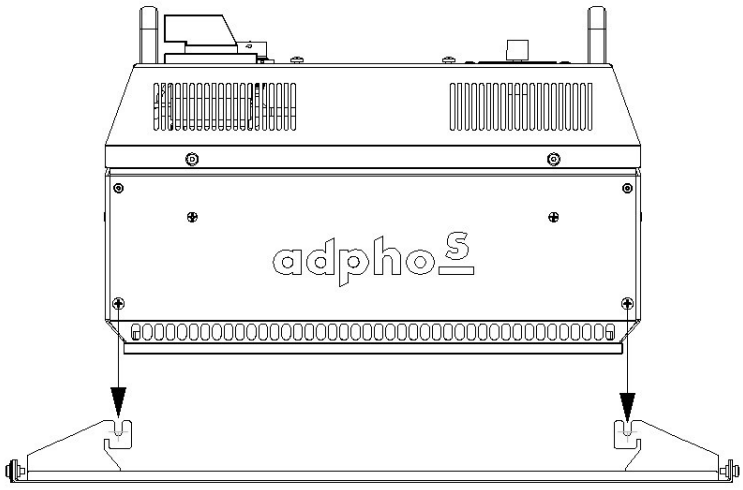
To mount NIR120 M modules side by side both shields on the side can fold up as shown in fig. 6

Figure 6: optional light shield



To mount the light shield on the lower edge of the NIR120 M drying module unscrew the mounting screws on the long side until the screws can latch in the four supports of the shield (see fig. 7). Then tighten the 4 screws evenly.

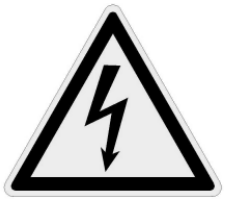
Figure 7: fastening of the light shield on a NIR120 M module



Remark:

If a customized light shield is used, the light shield must not disturb the air flow out of the dryer module. This could influence the cooling air supply of the module.

3.4. Electrical connection



Danger

Electric shock hazard

Only certified electrician may connect the NIR120 M system to the main electrical power supply.
It is only allowed to terminate the NIR drying system to mains specified on the type plate (max. voltage, current, frequency)

The NIR120 M drying modules are designed for use at 230 VAC 2-phase 50Hz/60Hz mains (1PE).

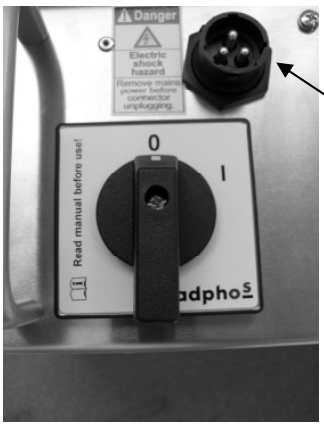
To order a power cord, call our central service point (1 262-790-9100) for detailed information.

Remark:

The module may only connect to the main by using a 3x 6 mm^2 (AWG 10) UL approved cable.

The connection of the power cord is carried out to the NIR120 M module by a Souriau UTS connector (3 Pin). The connector is placed near by the power main switch on the upper side of the drying module (see fig. 8).

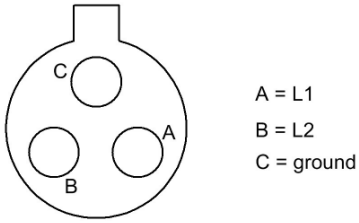
Figure 8: main connector of NIR120 M dying modules

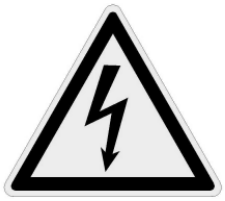


pin assignment see fig. 9

To connect the cable to the Souriau UTS connector attends the pin assignment as shown in fig. 9.

Figure 9: pin assignment of Souriau UTS connector (plan view of the mounted male connector)





Danger

Electric shock hazard

Before handling, connecting or disconnecting the Souriau UTS connector (in case of service or maintenance) the module must be switched off and physically disconnected from the mains.

Depending on the NIR dryer type, the following voltages and currents will be required (table 2):

Table 2: Required voltages and fuse rates for the different NIR120 M versions

Version	Voltage	Fuse rate	Phase
NIR120 M1	230 VAC (50 or 60Hz)	20 A	2-phase
NIR120 M2	230 VAC (50 or 60Hz)	20 A	2-phase
NIR120 M3	230 VAC (50 or 60Hz)	32 A	2-phase
NIR120 M4	230 VAC (50 or 60Hz)	40 A	2-phase

For the fuse protection of the main use fuses type CC.

3.4.1. Main power switch

The main power switch is located left of the upper side of the NIR120N module (see figure 8) and serves for connecting the power to the drying system. Two conditions are available.

Table 3: Conditions of the main switch

Position	Condition
0	drying system off
1	drying system on

3.4.2. Power supply watch

The controller of the NIR120 M drying module will permanently check the applied power voltage. If the power voltage is out of the specified range the module will be locked and the status LED of the analog input and output as well as the status LED near by the push button will fast blinking red.

If this error occur check your main and connect the NIR120 M dryer to the correct main power.

3.4.3. Emitter power monitoring

NIR120 M dryers can be equipped with emitters of different power classes.

The installed power of the emitters must not exceed the total power of the dryer.

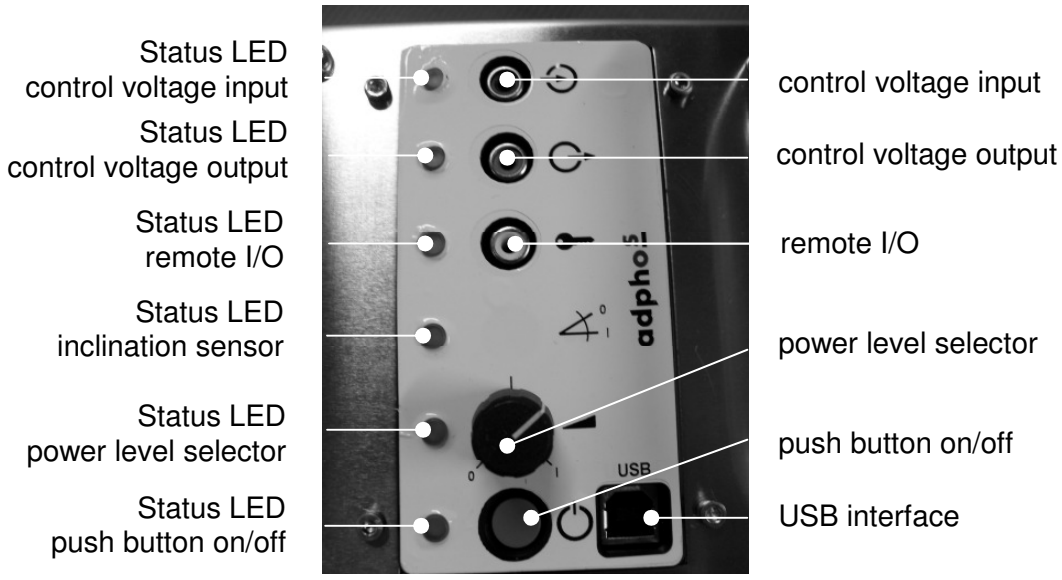
A permanent emitter power monitoring prevents the NIR120 M1, NIR120 M2 and NIR120 M3 drying systems for damage due to using NIR emitter out of the specified range. If the system detects emitters with too much power the dryer will be locked and the LED near by the push button will blinking green. This fault can't reset by any function. So shut down the system and install a correct NIR emitter set.

3.5. Control elements

All control elements of the NIR120 M drying modules are carried out right on the upper side of the NIR120 M drying modules. The control elements includes cinch connectors for control voltage in- and output, a cinch connector for the remote I/O, a potentiometer, a start push bottom and, finally, the USB plug socket. Six multi LED indicator lamps for indicate the module status are also integrated. A overview of the control elements is shown in fig. 11.

The connectors for the control voltage input and output and remote I/O are carried out as cinch-connectors ("RCA jack")

Figure 11: control elements of the NIR120 M drying module



3.5.1. Control voltage input connector (white color)

Notice

Damage of the module by using input voltage higher of 15 VDC or using AC voltage.

Use only a control voltage of less then 15 VDC.

In default configuration an external control (input) voltage signal is necessary for operating the NIR120 M drying modules.

The power controller for the NIR emitter works with a control voltage between 0 VDC and 10 VDC (default 0-10 VDC = 0-100% input power level).

The power of the emitters can be additionally aligned with the power level selector (potentiometer).

To connect your external control voltage to the NIR120 M drying module use a white standard industrial cinch plug. The standard configuration of the cinch-plug is Pin1 (pin contact):+-wire and pin 2 (annular contact): –wire.

If the maximum external control voltage signal is higher then 10 VDC the status LED near by the input connector will fast blinking red.

Remark for model NIR120 M1 only:

At the output connector (red color) a constant voltage of 10 VDC is applied.
If external control voltage is not available, this constant control voltage output of the module can be used for the input voltage signal.
Use a cable with two standard industrial cinch plugs and connect the control input connector (white) with the internal output connector (red).

Remark for model NIR120 M2, NIR120 M3, NIR120 M4:

These models can be configurated via USB.
Option to be configured:

- ***VDC input signal or resistor input signal***
- ***Power relation to input signal***

Call our central service point (phone +49-8061-395-0 or +1 262-790-9100) for detailed information.

To adjust the power of the dryer dependent upon print speed, an external control voltage from a tachometer or other device can be also applied.

3.5.1.1. Status LED for control voltage input connector and power supply

The status LED for the control voltage input connector is located near by the input connector (see figure 11). He display the status of the power supply. Table 4 shows the meanings of the different indicators:

Table 4: meanings of status LED control voltage input

Status	**Meaning**
Blinking red , fast	Supply voltage or input voltage are out of range
Red	Input value is less than 1%
Green	Input value is greater or equal than 1%

3.5.1.2. Tachometer operation

As described above, the NIR dryer system can operate with an external control voltage. To control the drying system proportional to the paper speed in an open loop control, a control voltage in the range of 0 VDC and 10 VDC must be available. If the control voltage is not available from the central controlling system (now base or web transport) an external tachometer must be mounted (e.g. on a roller or conveyor).

For proper operation to tachometer must output DC voltage.

Most off-the-shelf tachometer and wheel configurations do not conform to the specifications required to properly control NIR drying modules. The revolutions per minute (RPM) and subsequent voltages can be adjusted however with the use of an appropriately sized friction wheel. Table 5 shows the defined linear relationship between rotation speed and output signal of a tachometer.

Table. 5: output voltage subject to the rotation speed of a tachometer

n [min^{-1}]	120	200	300	400	500	600	700	800	900	1000	1100	1200
U [VDC]	1.1	1.9	2.7	3.5	4.3	5.2	6.0	6.9	7.7	8.5	9.4	10.2

Assumed full production speed is 492 fpm (150 mpm) To determine the adequate diameter of the friction wheel please use the following formula:

$$d / mm = \frac{v \cdot 1000}{n \cdot \pi},$$

where v = production speed in m/min
n = revolution of tachometer at 10 VDC in 1/min.

In our example the diameter of the friction wheel is 1.57” (39.8) mm.

3.5.2. Control voltage output connector (red color)

NIR120 M1:

At the control voltage output connector a constant Voltage of 10 VDC is applied.

NIR120 M2, NIR120 M3 and NIR120 M4 versions:

At the control voltage output connector the corresponding power level of the emitters is applied (default 0-10 VDC = 0-100% power level)

Remark for model NIR120 M2, NIR120 M3, NIR120 M4:

These models can be configurated via USB.
Option to be configured:

- ***Power relation to output signal***

Call our central service point (phone +49-8061-395-0 or +1 262-790-9100) for detailed information.

Notice

Damage of the module by connecting a input voltage.

Never connect input voltage to the control voltage out connector.

To use the external control voltage from the control voltage out connector of the NIR120 M drying module use a red standard industrial cinch plug.
The standard configuration of the cinch-plug is Pin1 (pin contact):+-wire and pin 2 (annular contact): –wire.

3.5.2.1. Status LED for control voltage output connector and power supply

The status LED for the control voltage output connector is located near by the output connector (see figure 11). It displays also the status of the power supply. Table 6 shows the meanings of the different indicators:

Table 6: meanings of status LED control voltage output

Status	**Meaning**
Blinking red , fast	Supply voltage or output voltage are out of range
Red	Output value is less than 1%
Green	Output value is greater or equal than 1%

3.5.3. Remote I/O (yellow color)

Caution

Fire hazard

Don`t use the NIR120 M module with a jumpered Remote I/O. In case of an unforeseen belt or paper stop, the NIR module will not shut down.

Notice

Damage of the module by using a control voltage for the Remote I/O.

Connect the Remote I/O only to a non-potential contact in the machine control.

By using the Remote I/O the NIR emitters can be switched on and off by an external control signal from a conveyor system, mailerbase or web system.

The Remote I/O requires a potential-free (dry contact) only!

For operation of the emitters, the remote I/O contact must be closed.

Don´t attach AC or DC voltage directly to remote I/O (use Interface box Remote I/O)

3.5.3.1. Status LED for Remote I/O

The status LED for the Remote I/O is located near by the Remote I/O connector (see figure 11). Table 7 shows the meanings of the different indicators:

Table 7: meanings of status LED Remote I/O

Status	Meaning
Blinking red , fast	Signal from the Remote I/O is invalid (e.g., not plugged or cable broken)
Red	Unlocked, contact open
Green	Locked, contact closed

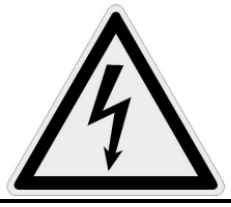
3.5.3.2. Interface-Box Remote I/O (optional adphos- no.:736022)

If a potential-free contact is not available in the machine control, a control voltage can be used in combination with the Interface-box Remote I/O (see figure 12).

The optional Interface-box Remote I/O consists of a electronic relay for control voltages in a range of 24….120 VDC/VAC.

The relay is integrated in a plastic box.
To connect the relay to the machine control a 16 feet (4,9 m) long 2x 0,75 mm^2 (AWG 19) cable with cable end sleeves is available.
For the connection to the NIR120 M drying module a 4.5 feed (1,4 m) long coaxial cable with a yellow cinch connector is present.

Figure 12: optional Interface-box Remote I/O



Danger

Electric shock hazard

Don´t open interface box

4. Inclination sensor

The inclination sensor is mounted at the internal control board of the NIR120 M drying module. His task is to watch the horizontal alignment of the module (standard operating position).

If the positional deviates more than ~10° from the horizontal, the module will be locked (maintenance position).

If the inclination sensor detect a deviation of more than ~10° during operation, the NIR120 M will be also locked (NIR Emitters shut down).
The device can only be unlocked in operating position.
In both cases the status LED (see chapter below) turns into red and the push button status LED (see chapter 3.5.6.1) turns into red blinking.
To unlock the device push the button (both status LED's will turn into green).

Remark for NIR120 M2, NIR120 M3, NIR120 M4:

These models can be configurated via USB.
Option to be configured:

- ***Operating position***
- ***Tolerance of inclination angle***

Call our central service point (phone +49-8061-395-0 or +1 262-790-9100) for detailed information.

4.1.1.1. Status LED for inclination sensor

The status LED for the inclination sensor is located below the status LED for the Remote I/O connector (see figure 11). Table 8 shows the meanings of the different indicators:

Table 8: meanings of status LED Inclination sensor

Status	**Meaning**
Blinking red , fast	Signal from sensor is invalid (e.g. not calibrated)
Red	Out of operating position, module ready
Green	In operating position, module is ready or running

4.1.2. Power level selector

The power level selector is a potentiometer located below the Remote I/O connector (see figure 11).

By rotating the knob of the potentiometer the power of the drying system will be adjusted.

The effect of adjustment depends from the kind of external control voltage (default).

If a constant external power control of 10 VDC is used, the power of the NIR dryer is continuously variable between 0% and 100% of the possible drying power (default).

If a variable external control device (e.g., tachometer signal) is used, the potentiometer is used to tune the power for the external control voltage for the drying power. Detailed information's will give in chapter 3.5.1. Optimal adjustment of the dryer is described in chapter 7.

4.1.2.1. Status LED for power level selector

The status LED for the power level selector (potentiometer) is located near by the power level selector (see figure 11). Table 9 shows the meanings of the different indicators:

Table 9: meanings of the different indicators for the power level selector

Status	**Meaning**
Off	Potentiometer disabled
Red	Value is less than 1%
Green	Value is greater or equal than 1%

4.1.3. Push button (green)

The push button will be used to unlock the NIR120 M dryer after any system error and the cause was eliminated. It is located below the power level selector (see figure 11).

Additionally, the push button can be used to lock the operating NIR120 M dryer manually by the operator (remote I/O closed). To restart the dryer, push the button again (remote I/O closed).

4.1.3.1. Status LED for push button

The status LED for the push button is located near by the push button (see figure 11). Table 10 shows the meanings of the different indicators:

Table 10: meanings of the different indicators for the power level selector

Status	Meaning
Red	Device is ready and is waiting for a start signal
Green	A start signal has been detected and the device is running now (the requested power still may be 0%)
Blinking red vs. green	Device not ready, an error condition holds
Blinking red	Device is initialising
Blinking red, fast	Device is locked (an error occurred while the device was running), the button must be pressed to unlock the device
Yellow	Overtemperature reflector (temperature switch set)
Blinking yellow vs green	Temperature threshold reached (environment temperature ≥ 40°C, CPU ≥ 65°C, triac ≥85°C)
Blinking green	One or several emitters are not working

4.1.4. USB interface

The internal USB-interface is only installed in the NIR120 M2, NIR120 M3 and NIR120 M4 version and will be used for parameterization and customizing the accordingly NIR120 M drying system.

Call our central service point (phone +49-8061-395-0 or +1 262-790-9100) for detailed information.

4.1.1. Emitter monitoring

The emitter monitoring is integrated in the internal control board of the NIR120 M drying system. The monitoring system watches the Emitter regarding operation during the drying process.

In case one or more emitters will fail, the status LED near by the push button (see chapter 3.5.7.) turns from green into green blinking.
The dryer will not lock or turn off.

Remark:

To emit a proper emitter monitoring the emitters must operated of min. 30% of the heater power. If the NIR120 M module will run with lower power, the detection failed.

5. "Master-Slave"operation

To use two NIR dryer modules in parallel ("stitching"), both dryers can be linked. In this configuration NIR120 M dryer will be defined as the master, and the other as the slave.

All safety and enabling procedures are carried out in the same manner as a single dryer system. All wiring must take place on both master and slave units as described earlier.

On the unit defined as the "master" all necessary adjustments will take place for correct and efficient drying.

The wiring to the "slave" module will happen by connecting a commercially available cinch cable from the control output socket of the master module to the control input cinch socket of the slave module. (see figure 8)

Remark:

Regarding the characteristics of the control voltage output for the different dryer versions the "master" module must be a NIR120 M2, NIR120 M3 or NIR120 M4 system.
The NIR120 M1 version can only use for the "slave" modul.

Call our central service point (phone +49-8061-395-0 or +1 262-790-9100) for detailed information.

To transmit the external control voltage from the master module to the slave module the power level selector set to "10.0". If the drying power of the slave module shall be lower than that of the master module, the power of the slave module must be reduced to the appropriate level by the power level selector on the slave module.

6. System installation

6.1. Basics

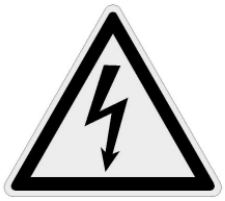
Important:

During operation of the drying systems, significant heat will be produced in the proximity of the dryer module. The installation location of the dryer module must be selected in such a way that no damage to the production line or objects in the surrounding area will be caused by the thermal effects of the drying system(s).

When mounting the dryer module on a web transport, make certain no components may be damaged by the thermal effects both beneath and to the sides of the web.

When mounting the dryer module on a sheetfed transport, make certain to use "high-temp" transport belts and the “top deck” of the transport is suitable for high temperatures.

6.2. Installation procedure



Danger

Electric shock hazard

Installation of NIR drying systems to be performed by trained personnel only. To connect the module to the main is only permitted by a qualified electrician .

1. Remove the packaging and check that the delivery is complete and undamaged.
2. Mount the NIR dryer module at the line. Make sure that the dryer module is parallel to the paper in a horizontal position and the distance to the paper surface complies with the specifications.
3. Mount the tachometer on the line according the manual (optional).
4. Attach a light shield at the module (optional).
5. Wire all cables as described in sections 3.4 and 3.5. Make certain to check that the Remote I/O functions correctly (safety related function).
6. Make certain the main power switch is in the “Off” position.
7. Set the power level selector (potentiometer) to the “0” position (turn left as far as it will go).
8. Lay a cable from the main to the NIR120 M module (consider the remarks in chapter 3.4). Mount the UTS connector to cable end at the module.
9. **Important: first plug the UTS connector into the UTS socket. Then connect the power cable to the main.**

10. Switch the main power switch to “1” position (on), the cooling fans in the dryer module will turn on. Additionally all Status LED’s one after the other are blinking red for a short time.
11. Turn on the mailbase or web transport thus supplying the proper Remote I/O signal to the NIR120 M drying module and allowing operation of the NIR emitters.
12. Be sure that a proper control voltage is applied correctly at the input control voltage connector.
13. Slowly turn the power level selector clockwise until a glowing light is visible under the NIR dryer module. (when the power level selector is set to maximum, the dryer will operate at 100% power.

If you have problems during the installation call our central service point (phone +49-8061-395-0 or +1 262-790-9100).

7. Adjustment of the dryer

7.1. General

When the power level selector is set to maximum, the dryer will operate at 100% power. Therefore turn the power level selector to the “0” position first to avoid any damages of the paper. Be sure that the module is mount an the mailbase or paper feeder properly.

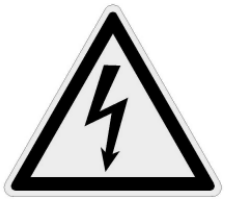
7.2. Adjustment procedure

After successful installation the next step is to adjust the degree of dryness.
Therefore follow the next instructions step by step.

1. Switch the main power switch to “1”position (on), the cooling fans in the dryer module will turn on. Additionally all Status LED’s are blinking red one after the other for a short time.
2. Turn on the mailbase or web transport thus supplying the proper control voltage to the NIR120 M module and allowing operation of the NIR emitters.
3. Slowly turn the power level selector clockwise until a steady glowing light is visible under the NIR dryer module.
4. Start the inkjet printing system printing and make test prints at the desired running speed.
5. Rotate the power level selector clockwise until the test prints are completely dry.

If you have problems during the adjustment procedure call our central service point (phone +49-8061-395-0 or +1 262-790-9100).

8. Maintenance



Danger

Electric shock hazard

Maintenance of electrical components to be performed only by trained electricians.

Before disconnect the Souriau UTS connector (in case of handling or maintenance) the module must be switched off and physically disconnected from the main.

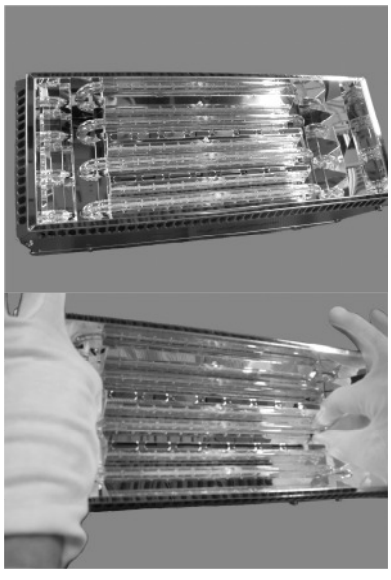
adphos NIR drying systems are designed to require minimal maintenance. The following components as described in table 11 should be checked according to the specified service interval.

Table. 11: Service intervals of components NIR dryer system.

No.	Component	Interval	Description
1	Reflector of the NIR dryer module	2 weeks	Visually inspect the reflector for dust, dirt and damage
2	NIR emitter	Monthly	Visually inspect the emitter(s) for dust, dirt and damage
3	Wiring	Monthly	Visually inspect all wires and cables for damage

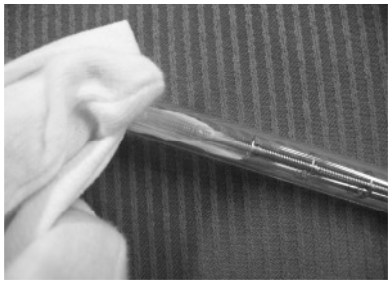
8.1. Cleaning of NIR emitter

For cleaning the NIR emitter follow the instructions below step by step:



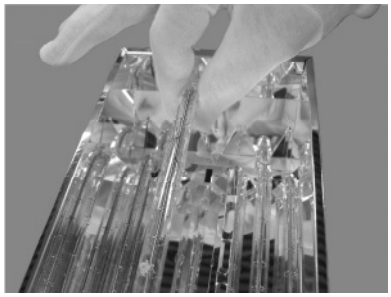
Before cleaning remove the dryer module(s) and place on a soft pad to avoid damage.
NIR emitters are only be touched or handled with protective cotton gloves. Sebaceous residues on the glass surface will reduce operation time dramatically. Before cleaning the emitters remove them out of the dryer module.

To remove the emitters out of the dryer module, with cotton gloves, gently grab the emitter on both ends by the 90 degree bend in the emitter and gently pull the emitter straight out of the dryer module being very careful to avoid touching of the emitter contact to the reflector (as an option one can order the emitter extraction tool adphos part number 726 174).



Light contamination can be removed with water and/or Isopropyl alcohol. Persistent contamination can be removed with a gentle polishing paste (see opposite figure).

If after cleaning the quartz glass bulb is still cloudy or damage is visible (specifically by the contact area) the emitter should be replaced.

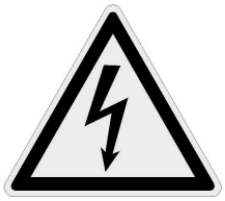


To reinstall the emitters be sure that the connecting contacts at the ends of emitters are straight and not bent (if they are bent, carefully straighten them). Carefully install the clean NIR emitter into reflector by taking the emitter in both hands (wearing protective cotton gloves!) and plug the contacts completely into the jackets of both ends of the reflector until the contacts are securely in place (be sure not to force or jam the contacts into the jackets!).

Important:

New emitters should always be cleaned with alcohol to remove any possible contaminants which may have been deposited during the manufacturing, shipment and storage of the emitters.

8.2. Cleaning of NIR reflector



Danger

Electric shock hazard

Maintenance of electrical components to be performed only by trained electricians.

Before disconnect the Souriau UTS connector (in case of handling or maintenance) the module must be switched off and physically disconnected from the main.
Make sure that no cleaning agents

Remark!
Before cleaning remove the dryer module(s) and place on a soft pad to avoid damage. Remove NIR emitter first! (see chapter 7.1)

Remark!
Avoid any flow or contamination of water or cleaning agents into the module. A damage of the module will occur.

NIR reflectors are manufactured out of specially coated aluminum sheets. Contamination of the reflectors results in a reduction of reflectivity which under certain circumstances can damage the reflectors or cause over temperature emergency stop.

Clean NIR reflectors only with a slightly damp micro fiber cloth (see fig. 13) to prevent any damages on the electrical components of the module.

Figure 13: cleaning of NIR reflector by slightly damp micro fiber cloth.

Additionally, for the use of cleaning agents note the following hints:

1. For cleaning of NIR reflectors a commercial cleaning agent in a pH-range of 3.0 up to 4.5 should be used, e.g. lemon cleaner. At this, note the instructions for use (e.g. mixing ratio with water) of the manufacture. For the first application the pH-value should be checked with control strip.
2. Under no circumstances may be used agents with abrasive additives such as scouring agents!
3. In no case vinegar cleaner or neutral cleaning agents as soon as alkaline cleaning agents should be used for the cleaning procedure of NIR reflectors.

Generally, for each NIR reflector a clean, soft und non-fuzzing cleaning tissue, e.g. cotton tissue, should be used.Do not apply force during cleaning and do not try to remove insistent contaminations by using sharp objects as damage to the reflector surface will occur.

8.3. Replacement of NIR reflector(s)

Danger

Electric shock hazard

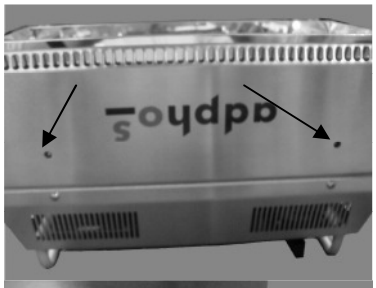
Maintenance of electrical components to be performed only by trained electricians.

Before disconnect the Souriau UTS connector (in case of handling or maintenance) the module must be switched off and physically disconnected from the main.

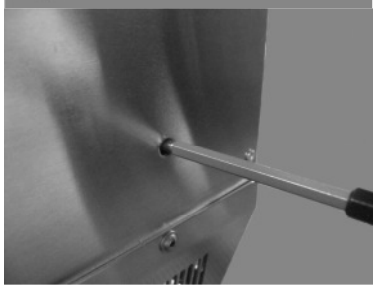
Remark!
Before cleaning remove the dryer module(s) and place on a soft pad to avoid damage. Remove NIR emitter first! (see chapter 7.1)

If contaminations cannot get removed from the surface, the reflector must be replaced.

Therefore follow the instructions below step by step

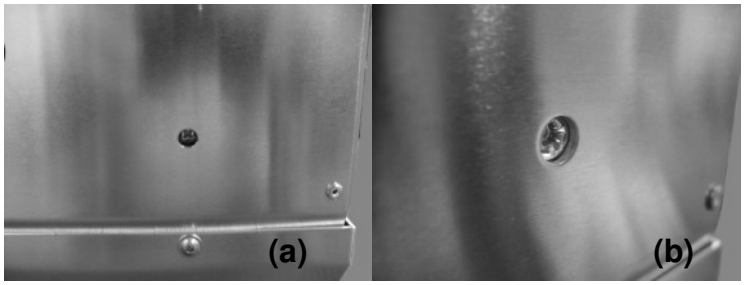


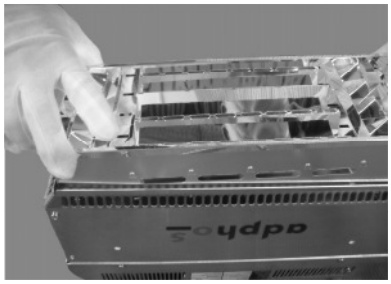
The reflector is fixed on the module by 4 screws inside the NIR120 M drying module. The access is carried out by 4 holes in both long side exterior plates (see opposite fig.).



To bold the screws use a Phillips recessed head screwdriver (size PHX). Turn the screwdriver counter-clockwise and unscrew the screws up to the stop.

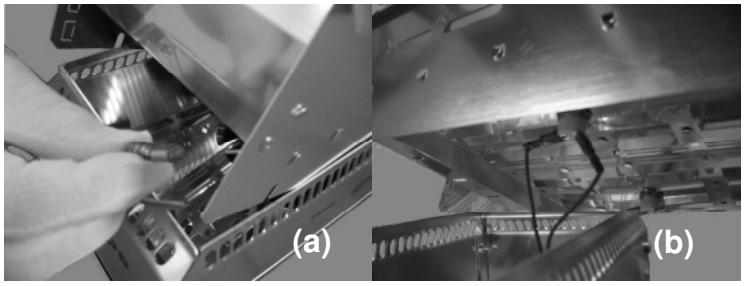
The opposite figures shows the position of the screws tighten (a) and bold (b)



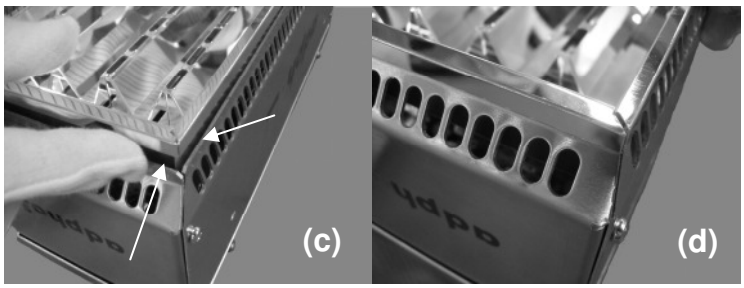


Carefully extract the reflector device upward. The reflector device is even connected with three cables (1 grounding cable and two cables for the thermo switch) to the control unit.

First strip the ground cable from the contact tab at the edge the long side plate (a). Then strip both cables from the thermo switch in the middle of the reflector unit (b). Now the reflector unit is removed and can exchange to a new one.



The assembly of the module with the new reflector will be carried out in the reverse order. Take care that the edges of the module plates (see arrows in c)) are completely fitted in the framed notch of the reflector device (d).



Finally tighten the 4 screws as described above.

If you have any further questions about the reflector exchange, contact our central service point (phone +49-8061-395-0 or +1 262-790-9100) for information.

8.4. Maintenance case (optional)

Required tools and materials (except liquid solvents and micro fiber cloth) are arranged in a special maintenance case. This case is available by the order-no. 712 373.

9. Component and spare part list

9.1. NIR120 M1 and NIR120 M2

Description	Quantity	adphos-order-no.	Parts list position
NIR120 M1 - drying module (without NIR emitters)	**1**	**735 891**	
NIR120 M2 - drying module (without NIR emitters)	**1**	**735 892**	
Light Weight Reflector (LWR), complete for NIR120 M1 or NIR120 M2	1	735 353	1
NIR Emitter LB-11/230V-250 (1kW)	3	735 679	2

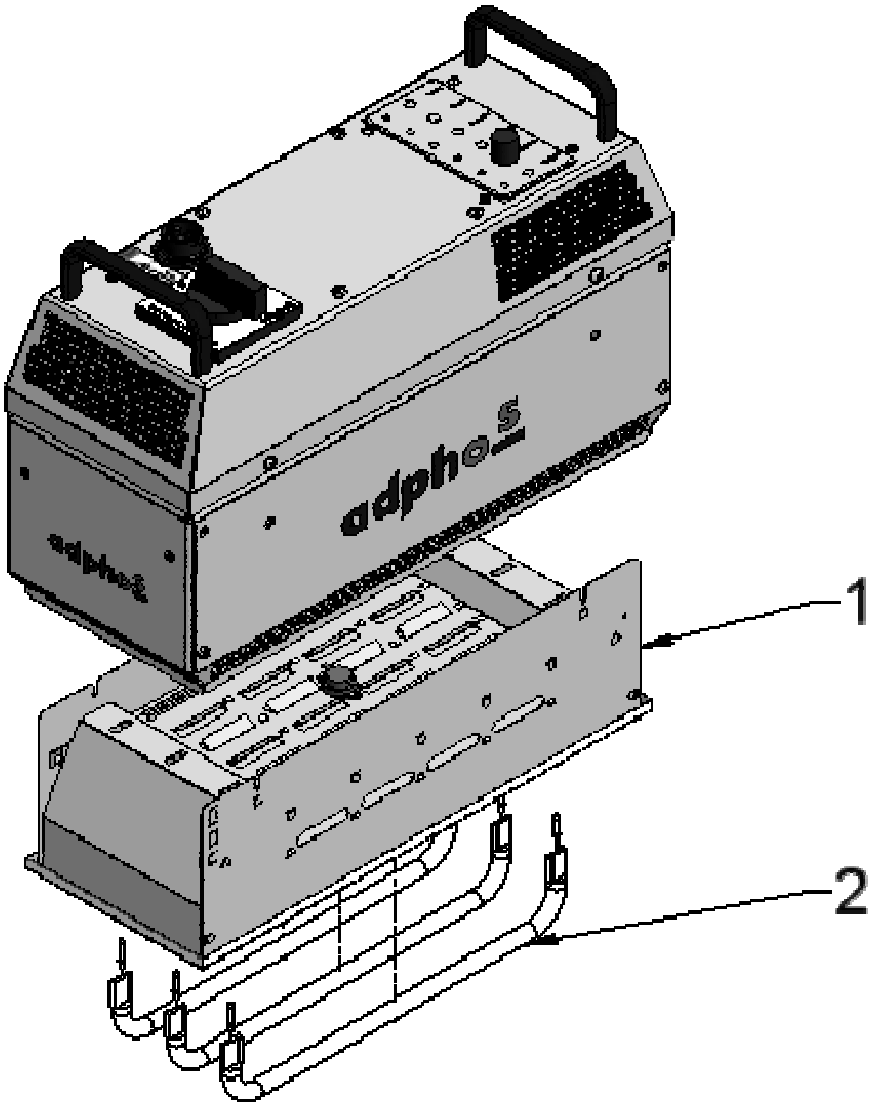
9.2. NIR120 M3

Description	Quantity	adphos-order-no.	Parts list position
NIR120 M3 - drying module (without NIR emitters)	**1**	**735 893**	
Light Weight Reflector (LWR), complete for NIR120 M3	1	736 142	1
NIR Emitter LB-11/230V-250 (1kW)	3	735 679	2
NIR Emitter NB-21/230V-250 (2kW)	3	735 677	2

9.3. NIR120 M4

Description	Quantity	adphos-order-no.	Parts list position
NIR120 M43 - drying module (without NIR emitters)	**1**	**735 894**	
Light Weight Reflector (LWR), complete for NIR120 M4	1	736 143	1
NIR Emitter LB-11/230V-250 (1kW)	3	735 679	2
NIR Emitter NB-21/230V-250 (2kW)	3	735 677	2
NIR Emitter HB-31/230V-250 (3kW)	3	735 263	2

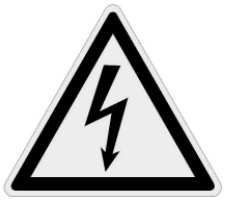
NIR120



10. Optional equipment and maintenance material

Description Maintenance materials / Option	**Quantity**	**adphos order-no.**
NIR protection goggles	1	408 857
pull-off gripper for NIR emitter	1	726 174
cotton gloves	1 package	403 166
Complete maintenance set in a case , includes - NIR protection goggles - Pull-off gripper - Cotton gloves - Cleaning paste for NIR emitters	1	712 373

11. Troubleshooting



Danger

Electric shock hazard

Maintenance of electrical components to be performed only by trained electricians.

Before disconnect the Souriau UTS connector (in case of handling or maintenance) the module must be switched off and physically disconnected from the main.

If issues cannot be solved by using the troubleshooting matrix described below, call the central adphos service point (phone +49-8061-395-0 or +1 262-790-9100)

Failure	Cause	Display status LED	Action
NIR emitter doesn't work	Module not connect with main	-	First plug Souriau connector into socket second connect power cable to main
	Main switch in "0" position (off)	-	Set main switch to "1" position (on)
	Main power out of range	AI[1]: blinking red fast AO[2]: blinking red fast	Check the main source
	Module not in horizontal position	Pi[3]: red Pb[4]: blinking red fast	Set module in horizontal position Press push button to unlocked the dryer
	Remote I/O contact open	IO[5]: red	Check the Remote I/O signal
	Control voltage too low	AI[1]: red AO[2]: red	Check the control voltage, dryer will start at a control voltage ≥ 100 mV DC
	Control voltage more the 11VDC	AI[1]: blinking red fast AO[2]: red Pb[4]: blinking red fast	Check the control voltage; control voltage max. 10 VDC. Press push button to unlocked the dryer
	Power level selector "0" position	Ps[6]: red	Turn the knob clockwise until the emitter work correctly
NIR emitters work but shut down after a present time	Temperature switch set	Pb[4]: yellow	Check the position of the module regarding accessibility cooling air, check the reflector regarding pollution.
	Internal temperature threshold reached	Pb[4]: blinking yellow vs. green	Check the position of the module regarding accessibility cooling air and environmental temperature
	Installed emitters out of the allowed range	Pb[4]: blinking green	Install the correct emitter types

[1]AI = Analog input
[2]AO = Analog output
Pi[3] = Inclination sensor
Pb[4]: = Push button
IO[5] = Remote I/O
Ps[6] = Power level selector